

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)

Administration of the North)
American Numbering Plan)

CC Docket No. 92-237 /

Phase 2

(Feature Group D Access Codes)

GTE REPLY COMMENTS

GTE Service Corporation, on behalf of its affiliated telephone operating companies ("GTOCs") and GTE Mobile Communications (collectively, "GTE"), hereby submits its Reply Comments on the Phase 2 issue of Feature Group D Access Codes identified in the Commission's Notice of Inquiry ("NOI"), FCC 92-470, released October 29, 1992, in the above-referenced docket.¹

INTRODUCTION

In the NOI, para. 36, the Commission noted that almost all available Carrier Identification Codes ("CICs") used for both Feature Group B ("FG-B") and Feature Group D ("FG-D") access have been assigned and that the industry has agreed on plans to expand the CIC to four digits. The FCC inquired as to

¹ By an Order, released January 8, 1993, the Deputy Chief of the Common Carrier Bureau extended the due date for Reply Comments on Phase 1 of this proceeding until February 24, 1993. However, because Phase 2 of the Inquiry deals with a much more narrowly-focused issue, the planned expansion of Carrier Identification Codes from three to four digits, the FCC did not wish to create delays on this important issue and did not extend the Reply Comment date for Phase 2. (Id.)

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whether it is worthwhile to move from a Carrier Access Code ("CAC") format of 10XXX (where XXX is a three-digit CIC) to 101XXXX (where XXXX is the four-digit CIC). (NOI, para. 38) The FCC asked specific questions regarding: the costs and technical issues with the four-digit FG-D CIC; the benefits of the expansion; whether other alternative technical approaches could be used; and, if FG-D codes were not expanded, what rules should govern the assignment, recall, transfer and use of the FG-D codes that will be available. (Id.)

In its Comments at 20-21, GTE noted that when the present three-digit format was established, exhaustion of numbers was not viewed as a problem since the XXX, as implemented, allowed 969 numbers and the number of interexchange carriers ("IXCs") was not expected to surpass that number. As GTE stated: "If the assignment was limited to IXCs and the IXCs were limited in the number of codes assigned, there would not be an exhaustion problem at the present time." (GTE Comments at 21) Expanding the CIC to four digits causes increased costs for Local Exchange Carriers ("LECs"). However, GTE is not aware of any alternative technical approach that is less costly or technically superior to the industry-agreed upon approach if FG-D CIC expansion is going to be implemented. If the FCC decides that expansion is not in the public interest, and that only three-digit CICs will be used, then GTE recommended that merger and acquisition codes be included in the number of codes counted as assigned to an entity. (GTE Comments at 23) In these Reply Comments GTE will address some of the concerns or issues raised by other parties in their Comments.

DISCUSSION

There are numerous issues the FCC must quickly decide regarding FG-D CIC expansion.

As stated, CICs are numeric codes which are currently used to identify customers who purchase FG-B and/or FG-D access services. These codes are used not only for routing from the local exchange network to the access purchaser, but also for billing between the local exchange company and the access purchaser. The CIC also comprises part of the CAC, a dialing sequence used by the general public to access a preferred provider of service. The CAC format currently used by customers to access their provider of choice is "10XXX." The XXX portion of the CAC indicates the three-digit CIC. The new CAC that is proposed is "101XXXX" with the XXXX portion indicating the four-digit CIC.

Most commenters have acknowledged that it will be impossible to have a flash cut to four-digit CIC numbers. Some sort of time period is necessary for the various companies to convert to the new dialing scheme. This is called the Permissive Dialing period. The Industry Carriers Compatibility Forum ("ICCF") tried to define the time frame associated with the Permissive Dialing period. It was unable to do so when consensus within the industry could not be obtained. Opinions were split basically along industry segment lines. The majority of LECs participating in the ICCF preferred an eighteen-month Permissive Dialing period. The IXC's preferred to extend this permissive period toward infinity. Both industry segments have understandable logic behind their opinions. Bellcore, as North American Numbering Plan Administrator ("NANPA"), picked an eighteen month permissive transitional period. As Bellcore noted in its Comments: "To date, NANPA's decision has not been challenged." (Bellcore at 4, n.4)

The IXCs are concerned with retraining customers to use the new CAC and are probably also concerned with costs of changing their advertising and training media. The longer the Permissive Dialing period, the longer these costs can be delayed and/or the longer period of time the IXCs have to recover the costs.

From the LEC viewpoint, there is much concern with extending the Permissive Dialing period for twelve (12) years as stipulated by AT&T and great concern with extending it to infinity as stated by Sprint. Besides the translation problems outlined in the attached Appendix A elaborating on the CIC expansion issue, GTE believes that the Commission should weigh the following in making its decision:

1. Costs are a major concern within the industry and are also a concern of GTE. But GTE recognizes that the reason that CICs are being expanded is due to customer demand and the competitive nature of telecommunications. Who could have believed in 1984 that there would be more than 969 possible access customers? Failure to expand the number of CICs could result in restraint of competitive forces as future service providers are not allowed into the marketplace. However, cost recovery for LECs may need to be reconsidered and allowed on an exogenous basis.²
2. Retraining customers to use the new CAC format will be a problem for the industry. GTE believes that this will not be as bad a problem as the customer confusion factor that would exist if two different CACs are used

² For example, see Bell Atlantic at 4 and Pacific Telesis at 9-10.

for an extended time. When and where should the 10XXX CAC be used as opposed to the 101XXXX CAC?

3. Dialing parity will be a thing of the past if the Permissive Dialing period is prolonged. Future competitors will automatically be at a disadvantage because users of their services will be required to dial two (2) additional digits just to access them. GTE and the Regional Bell Operating Companies also have Consent Decree obligations that require non-discriminatory access and an equal number of digits for interexchange access.³

4. Billing and other support systems may require modifications if both three- and four-digit CICs are allowed.⁴

To assist the Commission in its deliberations over these concerns, GTE has attached an Appendix A outlining the key reasons for the industry proposal, definitions of some terms, activities that take place at switching centers during the conversion, the nature of the requirements for switching and signaling systems, the impact on support systems, and why ambiguous CIC numbers create problems and why the

³ Appendix B of the GTE Consent Decree, Paragraph A.3.(c) provides that:
At such time as the national numbering area (area code) plan is revised to require the use of additional digits . . . each GTOC shall provide exchange access to every interexchange carrier through a uniform number of digits.

Thus, GTE must maintain dialing parity in the CAC for all interexchange carriers that obtain access service from the GTOCs. The Regional Bell Operating Companies have a similar requirement in Appendix B of the Modified Final Judgment ("MFJ"), at A.2.(iii).

⁴ These modifications would be in addition to those required for expansion to a 101XXXX format only.

public interest requires the conversion to occur in a minimum amount of time, and in no event longer than eighteen months.

CONCLUSION

GTE believes most issues involved in CIC expansion have been resolved in industry meetings. However, there are significant costs that will need to be recovered by LECs and the Commission may wish to reconsider whether those costs should be treated as exogenous under the Price Cap rules. In order to keep those costs as low as possible, the conversion period should be as short as possible. In the event three-digit CICs are not expanded, GTE urges the use of the ICCF guidelines on the number of codes per entity, except GTE feels strongly that merger and acquisition codes should be included in the number assigned to an entity.

Respectfully submitted,

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APPENDIX A

TECHNICAL DISCUSSION OF FG-D EXPANSION

Reasons For The New Carrier Access Code Assignment.

If the numbering resource is to be expanded from the currently available 969 Carrier Identification Code ("CIC") numbers to 10,000 codes there are two options: (i) the Carrier Access Code ("CAC") number must change or (ii) the entire nation has to perform a "flash cut" to four-digit CICs. Of course, this flash cut would be next to impossible given the number of switching offices (*i.e.*, over 20,000) and the complexity of the task. The industry decided to have a new CAC.

The new CAC (101XXXX) was assigned to allow the permissive use of either three-digit or four-digit CICs to provide time for the national network of 20,900 Central Offices to migrate to four digits. This, for example, allows an Access Tandem ("AT") to accept CICs from some End Offices on a three-digit basis and from other end offices on a four-digit basis.

An integral part of the Feature Group D ("FG-D") CIC expansion project, as planned, is a Permissive Dialing period which enables a customer to selectively dial the old CAC format: "10XXX" or the new CAC format: "1010XXX." Based on this, all switching systems must be able to differentiate between these two dialing patterns.

Definitions.

An Unambiguous code; is a string of digits (or dialed code) that has only one possible meaning. The switching system is directly able to translate and route the call without the requirement to invoke timing to determine end-of-dialing.

An Ambiguous code; is a string of numbers that can mean several different things depending upon the exact number of digits eventually dialed or assumed dialed due to a time-out. An ambiguous code is normally resolved by timing within the switch, based upon knowing the total length of each digit string. For example, if 1 + NXX-XXXX is dialed and the NXX code can be either a Numbering Plan Area ("NPA") Code or a Central Office code (therefore, ambiguous), the switch must invoke timing after the eighth digit dialed to determine if only 8 digits were intended to be dialed. If only 1 + 7 digits are

dialed, the switch will assume an office code was dialed and complete the call accordingly, routing to the end office represented by the NXX code. If 1 + 10 digits are dialed, the switch will assume an NPA code was dialed and complete the call by routing to the appropriate NPA. But, the key is that the switch must have some method of resolving the ambiguity of each such call. In addition, the switching system must use additional computer resources for each occurrence of possible time-out. This adds to the total realtime used and may limit the overall capacity of some switches.

Switch Operation During Planned CAC Conversion.

The current CAC format in use today is "10" followed by a three-digit CIC (i.e., "XXX") where X may equal any number (0 through 9). The proposed (new) CAC format for use with four-digit CICs is "101 XXXX," again, where X may equal any number (0 through 9).

An unambiguous dialing code format (CAC) is required so that the switching systems are able to determine proper translations. An ambiguous code requires timing to be used on more calls because the exact number of digits that follow the access code cannot be guaranteed. Timing all such calls nationwide is next to impossible. In addition, some older type Stored Program Control ("SPC") Switches require the use of unambiguous codes.

In the new four-digit CIC assignment system, existing three-digit CICs will be converted to a four-digit format by placing a leading "0" in front of the current code. This action will convert all existing three-digit CICs to the form "0XXX." This is the first step in the Permissive Dialing period. This allows the switching systems an unambiguous code format to distinguish between 5-digit "10XXX" and 7-digit "1010XXX," but does not expand the total number of CICs that are assignable. The second stage is to allow the assignment and use of "1015XXX" and "1016XXX" format CICs. This does expand the resource to 2,969 CICs.

The switch will be able to analyze the CAC from the "10" digits in all the above cases and treat it as a prefix code (such as 1 and 0). The "key" to this operation is that no three-digit FG-D CIC assignments have been made yet in the 10X, 15X, or 16X series of codes. The CAC format (either five-digit or seven-digit) will be determined by examination of the third and fourth digits following the receipt of the digits "1" and "0" of a potential CAC sequence. If a 10, 15, or 16 appears in this 2-digit sequence, it will be concluded that a 7-digit CAC of the form 1010XXX, 1015XXX, or 1016XXX is being processed. Receipt of any other 2-digit sequence in the third and fourth digit positions will be treated as a 5-digit CAC. This method of operation will apply during the Permissive Dialing period. Following the Permissive Dialing period, after total conversion to four-digit CICs, any 101 XXXX code will be recognized as a CAC code.

APPENDIX A

For example, if the customer dials "10 288," the switch looks at the "10" as a prefix, and then analyzes the third and fourth digits "28." Since the digits are not in the format 10, 15, or 16, a five-digit CAC sequence is assumed. Therefore, the third, fourth and fifth digit positions are assumed to be a CIC, and the call is routed accordingly. If the same customer dials 101 0288, the switch will look at the "10" as a prefix code and analyze the third and forth digits, "10." It will be concluded that a 7-digit CAC is being processed. The switch will then wait until digits five, six and seven are received. At this point, digits five, six, and seven are assumed to be a CIC, and the call is routed accordingly. This method of operation allows the switch to "know" after the CAC, the format of the digits to follow. There could be no digits, 1 digit, 3 digits, 8 digits, or 11 digits, or more (for international calls) to follow. For example, if the first digit received is a "0" the switch will go into a fast time-out mode of approximately 4 seconds, and connect to the IXC's operator after time-out. If "0" plus additional digits are dialed, the switch seizes the IXC FG-D carrier's circuit after an additional 6 digits, sends the first stage of signaling (Calling Number Automatic Number Identification or "ANI"), and overlap out-pulses the called number as received.

Therefore, it is imperative that a switch be able to recognize a prefix code in an unambiguous manner, this allows the switch to apply time-out only where needed after 7 or 10 digits; for example, for true ambiguous codes that may follow the prefix such as NPA/NXX. Without an unambiguous prefix code, the switching system may be forced to look for time-out after almost every digit. The following table shows that time-out might be required after every digit dialed from position 5 through position 18.

Case	Dialed Digits	Dialed Digits to show intent
1.	10111*	10 111
2.	101110*	10 111 0
3.	10111411*	10 111 411
4.	101111411*	10 111 1 411
5.	101111111111*	10 111 111 1111
6.	101111111111*	10 111 1 111 1111
7.	10111111111111*	10 111 111 111 1111
8.	10111111111111*	10 111 1 111 111 1111
9.	1011111*	101 1111
10.	10111110*	101 1111 0
11.	1011111411*	101 1111 411
12.	10111111411*	101 1111 1 411
13.	10111111111111*	101 1111 111 1111
14.	10111111111111*	101 1111 1 111 1111
15.	1011111111111111*	101 1111 111 111 1111
16.	1011111111111111*	101 1111 1 111 111 1111

* Switch must look for Time-out to determine end of dialing

Time-out in itself has several drawbacks. The customer may reach wrong numbers due to dialing delay. The total time to complete a call increases (Post-Dial Delay), because the switch must wait to see if additional digits will be received prior to processing the call. Overlap-type signaling to reduce call setup time is not usable, because the switch must wait to receive all digits prior to signaling forward.

Switching Systems and the North American Numbering Plan ("NANP") in general would have a major problem if total inter-changeability were to be allowed; that is, 10 XXX (three-digit CIC), 10 XXXX (four-digit CIC), 101 XXX (three-digit CIC), and also 101 XXXX (four-digit CIC). The following conditions would occur:

<u>Case</u>	<u>Dialed Digits</u>	<u>Dialed Digits to show intent</u>
17.	1011111111111111	10 111 1 111 111 1111
18.	1011111111111111	10 1111 1 111 111 1111 *
19.	1011111111111111	101 111 1 111 111 1111 *
20.	1011111111111111	101 1111 1 111 111 1111

- * In fact Case 18 and 19 above are exactly the same number but the intent of the caller was NOT the same. In Case 18 the caller dialed the old CAC (10) + New CIC (1111) + NPA + NXX + 4D. In Case 19 the caller dialed the new CAC 101 + Old CIC (111) + NPA + NXX + 4D. This situation of course must NOT be allowed.

During the planned Permissive Dialing period, the proposed New Feature Group D CAC is to be established as "101XXXX" with a "1010XXX," "1015XXX," or "1016XXX" limitation to enable adoption of a four-digit CIC in an unambiguous manner.

Prior to the exhaust of the 0XXX, 5XXX, and 6XXX series of four-digit CICs, the Permissive Dialing period is planned to end and the "10" CAC would be placed on intercept. The remaining series of CICs would then be assigned. Thus, only one CAC needs to be recognized by the switching systems, greatly simplifying operation and translations.

The current plan for phasing in the new "101" CAC and replacing the existing "10" CAC allows for a graceful transition that does not place an undue burden upon the switching resources of North America.

Billing Aspects Of CIC Codes.

In the past, CICs were used for more than only Routing and Access Charge Billing. In some cases, pseudo-CICs were used to provide customer billing in

the form requested. In other cases, older type SPC switches were unable to differentiate properly between Service Access Codes ("SAC") and route the call to multiple destinations without the use of pseudo codes. The use of pseudo-CICs also allowed greater flexibility in some switching systems to provide screening and blocking type services such as Toll Denial, Allow/Block, Require 1+, No-Prefix dialing, etc. GTE is in the process of purging all pseudo-CICs from its network. The required switching systems are being modified in conjunction with CIC FG-B expansion (called Phase 1) to provide the ability to differentiate between SAC numbers and route the call to multiple destinations without the use of pseudo codes. Phase 1 of CIC expansion begins April 1, 1993.

Scope Of Changes.

The purpose of this section is to outline the feature requirements that GTE predicts will be required for FG-D expansion to ensure that the equipment vendors take the projected CIC FG-D expansion (called Phase 2) feature/capability into consideration when designing the feature content described in FG-B expansion of Phase 1, as well as the Phase 2 requirements.

Phase 2 FG-D industry changes include the following:

- (1) New Feature Group D CAC is established as "101XXXX" with a "1010XXX" limitation during the Permissive Dialing period, to enable adoption of a four-digit Carrier Identification Code.
- (2) Concurrent dialing of new and old FG-D CACs is allowed throughout the industry to provide an orderly transition from present (10XXX) to the new access code (101XXXX).
- (3) Once all "0XXX" FG-D CIC combinations have been exhausted, the next series of codes to be utilized will be "5XXX" and "6XXX" prior to adopting the all XXXX combinations (as needed).

Network changes for the FG-D CIC expansion will also be made in a planned sequence. It has been agreed that a nationwide "flash" cutover is not feasible. A plan has been developed that organizes incremental changes to the switching systems, databases, etc., on a per Local Access and Transport Area ("LATA") basis. The general approach is based on switching node pairs. For a given pair, connecting trunks or signaling links are subject to individual conversions. Specifically, the plan calls for, in sequence:

- (1) Readiness of each designated Service Control Point ("SCP") database and Service Management System ("SMS") to store all active CICs, including both three-digit and four-digit CICs, and for the SCP to respond selectively with either three-digit or four-digit CICs to queries from

Service Switching Points ("SSPs") and Operator Service Systems ("OSSs").

- (2) Readiness of Access Tandems ("ATs") to accept four-digit CICs (instead of three-digit CICs) on updated trunk groups from subtending Equal Access End Offices ("EAEOs") and to accept four-digit CICs from an SCP when the AT is acting as an SSP. The OSS interface (where applicable) should also be updated at this time to accept four-digit CICs.
- (3) Readiness of End Offices ("EOs") to accept both the 10XXX and the 101XXXX dialed formats for a period of time sufficient to accommodate end user adjustments and to accept four-digit CICs from an SCP when the EO is acting as an SSP.
- (4) Readiness of the Inter-LATA (IXC) switches (if desired by the IXC) to accept four-digit CICs in international signaling protocols on trunk groups from updated subtending EOs and ATs.

Switching System Requirements.

A software switch or recent change mechanism must be available to enable/disable the Permissive Dialing and routing within a switch for Feature Group D access and to disallow 10XXX dialing at the end of the Permissive Dialing period:

Now: A user dials: 10XXX

After: A user may dial either 10XXX or 1010XXX during a permissive period within the same central office and reach the same "XXX" carrier.

A software switch or recent change mechanism must be available to enable the routing and translation of 10XXX or 10WXXX within the switch for Feature Group D access, where, W can equal any digit from 0-9 (long term).

Although it is anticipated that the Permissive Dialing time-period will be approximately eighteen months, it has not been finalized. A software switch or recent change mechanism is necessary to allow GTE to deactivate the dialing of 10XXX when the Permissive Dialing period is ended on a per-site basis. Once deactivated, anyone dialing "10XXX" instead of "1010XXX" will be routed to a separate intercept recording.

After the Permissive Dialing time-period, only CACs in the seven-digit format (101XXXX) where X represents any digit 0 through 9, will be accepted. The EO should immediately reject as invalid all potential CAC sequences that do not

begin with the digits 101. Unassigned CICs within the 7-digit 101XXXX format will receive vacant code treatment.

The new cut-through format for Feature Group D will also be changed to 101XXXX. After the Permissive Dialing period has ended, the 10XXX format should be blocked.

The switching system software should have the ability to block 10XXX or 101XXXX Permissive Dialing from all associated class-of-service lines to an IXC. This ability should be implemented on a per IXC basis, to allow the IXC the choice of accepting or rejecting this type traffic.

Signaling.

Multi-frequency ("MF") equal-access signaling must be adjusted for an additional digit (KP-0ZZ-XXXX-ST) when outputting to an AT and for an additional digit (KP-1NX-XXXX-CCC-ST) on international signaling protocols. The total number of digits to be handled must increase.

Signaling System No. 7 ("SS-7") equal-access signaling is affected to the extent that it must be similarly adjusted to carry a four-digit CIC. SS-7 Transaction Capabilities Application Part ("TCAP") will also require adjustment for database transactions. This will be required for features such as Exchange Access Alternate Billing Service ("ABS"), Enhanced 800 Service, and others.

D-channel Integrated Services Digital Network ("ISDN") signaling will need to accommodate four-digit CIC (TR-TSY-000268, Issue 3, Sections 6.6 and 7).¹ Figure 7-28 in the TR illustrates the Transit Network Selection Information Element. The adaptation to carry a four-digit CIC is accomplished by showing an increase of one octet for "length" and adding one decimal digit of capacity in IA5 character coding.

Switching System Requirements.

End Offices Stored Program Control Switching Systems.

EOs should be equipped with an option to process both five-digit CACs of the form 10XXX and seven-digit CACs of the form 1010XXX, 1015XXX, and 1016XXX for a planned Permissive Dialing period. The seven digit CAC will

¹ Reference to TRs and FSDs are references to documents available from Bellcore.

increase by two the maximum number of digits that may need to be registered in an End Office.

The End Office should continue to determine the end-of-dialing, as specified in the LATA Switching System Generic Requirements ("LSSGR") Sections 5.3 and FSD 20-24-0000 (and FSD 20-24-0020, if EO is so equipped) with the following exception: The CAC format (either 5-digit or 7-digit) should be determined by examination of the third and fourth digits following the receipt of the digits "1" and "0" of a potential CAC sequence. If a 10, 15, or 16 appears in this 2-digit sequence, it should be concluded that a 7-digit CAC of the form 1010XXX, 1015XXX, or 1016XXX is being processed. Receipt of any other 2-digit sequence in the third and fourth digit positions should be treated as a 5-digit CAC. This will apply during the Permissive Dialing period. Following the Permissive Dialing period, any 101XXXX code must be recognized as a CAC.

The End Office must be able to properly translate the CAC in the presence of interchangeable NPA/NXX codes. The interchangeable format is NPA = NXX as well as NXX (office codes) codes = NXX, where N = digits 2-9, and X = digits 0-9. GTE's proposed dialing plan for interchangeable codes is seven-digit local/Extended Area Service ("EAS") and 1 + ten (10) digits for Intra- and Inter-LATA Toll.

If a CAC is not specifically dialed by a caller, the customer's line is checked for presubscription to a Primary Interexchange Carrier ("PIC"), as discussed in FSD 20-24-0000 and 20-24-0040. The FG-D CIC expansion requires that an EO be able to identify up to 1,000 different PIC selections per EO, on a presubscription basis.

Separate translations will be required for the FG-B (950-XXXX) and FG-D CICs because the basic linkage between these codes is being discontinued during Phase 1 FG-B expansion changes.

End-Office translation capabilities should be expanded to provide translation for up to 2,969 CICs during the Permissive Dialing period when both five- and seven-digit CACs are accepted from customers.

Translation is required for the 0XXX, 5XXX, and 6XXX CIC sequences during the Permissive Dialing period.

System design should also allow for translation of up to 10,000 CICs when the CAC is subsequently expanded to 101XXXX.

When access to inter-LATA is attained via an AT, an updated EO must always transmit a four-digit CIC to the AT whether or not a four-digit CIC was received from the line origination. The EO must prefix a zero to a three-digit CIC when a three-digit code is received from a line, during the Permissive Dialing period.

Four-digit CIC transmission applies to both MF and SS-7 type signaling.

An updated End Office will not be allowed to transmit both three-digit and four-digit CICs on a given EO-AT trunk group.

Memory allocation for End Office's digit registration functions should anticipate a two-digit extension of today's maximum limits. This would include speed-calling or any other feature where the extension of the maximum number of digits dialed would affect operation.

Senders and receivers must be reviewed to insure that the two-digit addition to the maximum number of digits to be served can be accommodated.

The only instance where a CIC is directly passed to the IXC is with international signaling protocols. Thus, the KP-138-XXX-CCC-ST and KP-158-XXX-CCC-ST MF signaling sequences (where XXX = three-digit CIC) for international calls must also be expanded to provide for a four-digit CIC.

Four-digit CIC transmission applies to both MF and SS-7 type signaling.

An updated End Office will not be allowed to transmit both three-digit and four-digit CICs on a given EO-AT trunk group on international calls.

For international calls the three-digit CIC will remain a viable choice during the conversion period prior to expansion to the full 101XXXX CAC. Therefore, the EO will be required to transmit either a three- or four-digit CIC (NOT BOTH) to a given IXC, based upon a parameter setting for the LEC-IXC trunk group chosen for the international call.

If during the Permissive Dialing period, a four-digit CIC of the format 0XXX is received from the caller and a three-digit LEC-IXC trunk group is chosen for the call, the EO should delete the leading "0" and transmit the three remaining CIC digits to the IXC.

Access Tandem.

A modified AT must be prepared to receive four-digit CICs from updated EOs while retaining the ability to continue to process a three-digit CIC from non-updated EOs.

An AT should not receive (and will not be required to process) both three- and four-digit CIC signaling on the same trunk group from a given EO.

Receipt of four-digit CICs from a given EO applies for both MF and SS-7 signaling. For the MF case, the AT will receive KP-0ZZ-XXXX-ST, where XXXX represents the four-digit CIC.

The AT may distinguish between three- and four-digit CIC (received via MF trunk groups), either by counting digits or by associating the received digits with the incoming trunk class.

When a three-digit CIC is received from a non-updated EO during the conversion period, the AT must interpret the three-digit CIC (XXX sequence) as though the sequence 0XXX were received.

Although vacant three- and four-digit CICs will likely be detected and intercepted at the EO, the AT should also be capable of routing such calls to a vacant code announcement.

The AT should be capable of rejecting three-digit CICs from all EO sources once the conversion period has expired.

An updated AT will not be allowed to transmit both three-digit and four-digit CICs on a given AT-IXC trunk group on international calls.

For international calls, the three-digit CIC will remain a viable choice during the conversion period prior to expansion to the full 101XXXX CAC. Therefore, the AT will be required to transmit either a three- or four-digit CIC (NOT BOTH) to a given IXC, based upon a parameter setting for the LEC-IXC trunk group chosen for the international call.

If during the Permissive Dialing period a four-digit CIC of the format 0XXX is received from the EO and a three-digit LEC-IXC trunk group is chosen for the call, the AT should delete the leading "0" and transmit the three remaining CIC digits to the IXC.

As for the EO, the AT should provide separate translations for the FG-B (e.g., 950-XXXX) and FG-D (e.g., 0ZZ-XXXX for MF) CICs because the linkage between these codes will no longer be fully supported. Additional requirements are specified for an AT that acts as an SSP and for an AT that is equipped with OSS functionality.

Switching Service Point.

When the SSP is an Access Tandem and Equal Access MF ("EAMF") or SS-7 IXC/International Carrier ("INC") signaling is used from an EO to the AT/SSP, the SSP should be modified to be capable of accepting both three- and four-digit CICs from EOs as specified in the section, Access Tandem.

When three-digit signaling is used, the three-digit CIC "110" should be sent by the EO to indicate to the AT/SSP that processing of the call is required.

When four-digit signaling is used, the four-digit CIC "0110" should be sent by the EO to indicate to the AT/SSP that processing of the call is required.

The CIC sent in the two cases above should be settable/changeable via normal recent change procedures.

During the transition period, this value should be a four-digit code of the form "0XXX." After the transition has been completed, any four-digit CIC will be permissible.

This special CIC "0XXX" value is also used in the response from the SCP to indicate that the call should be routed via the telephone company.

When an SSP that has been modified to accept four-digit CICs needs to query an SCP, it should send an updated query. The updated query will be the same as one from an SSP that has not been modified to accept four-digit CICs, except that it will contain an additional parameter, as discussed in the SS-7 Signaling section, indicating that a four-digit CIC should be returned in the response message. The SCP will have been updated to transmit four-digit CICs to an updated SSP in accordance with the network transition sequence described.

For IXC/INC-type calls when the SSP is at an EO without direct trunks to the IXC/INC, the updated SSP should be capable of receiving a four-digit CIC from the SCP and transmitting the four-digit CIC to the AT, as described.

For International calls when the SSP is at an AT or at an EO with direct trunks to the IXC/INC, the SSP should be capable of receiving a four-digit CIC from the SCP and transmitting the appropriate three- or four-digit CIC to the IXC, based on the parameter setting for the IXC trunk group chosen for the call, as described.

Operator Service System.

The OSS should be capable of accepting both three- and four-digit CICs from EOs, as specified in the Access Tandem section.

When an OSS needs to query an SCP to continue call processing, it should send an updated query to the SCP. The updated query will contain an additional parameter as discussed in the SS-7 Signaling section, indicating that a four-digit CIC should be returned in the response message.

The SCP will have been updated to transmit four-digit CICs to updated OSSs, in accordance with the network transition sequence described. For international calls, the OSS should be capable of receiving a four-digit CIC from the SCP and transmitting the appropriate three- or four-digit CIC to the IXC based on the parameter setting for the IXC trunk group chosen for the call.

Database Systems.

The SCP should be prepared to return a three- or four-digit CIC to querying SSPs. The length of the CIC digit sequence included in the response to a particular SSP will be dependent on whether the SSP has been updated to handle a four-digit CIC. A four-digit CIC should be returned to an updated SSP and a three-digit CIC should be returned to a non-updated SSP.

The SCP should determine SSP status by examination of the initial query received from the SSP. If the parameter, CIC Expansion Indicator, is present in the initial query indicating the ability of the SSP to receive a four-digit CIC, and SCP processing indicates that a CIC should be returned in the response to the SSP, a four-digit CIC should be returned.

If the CIC Expansion Indicator parameter is not present, the SCP should return a three-digit CIC.

In the initial stages of network conversion during which no four-digit CICs have been assigned, if the SCP is expected to return a four-digit CIC in the response to an updated SSP, the SCP should modify existing three-digit CICs of the form XXX by appending a leading zero to create a four-digit CIC of the form 0XXX.

Once four-digit CICs begin to be assigned, the SCP should be able to receive a four-digit CIC from an external support system such as SMS, and store the code in its database. The SCP should then be able to return those four-digit CICs to updated SSPs.

During the network conversion period, a situation may arise when an SSP equipped to handle only a three-digit CIC queries the SCP, but processing at the SCP identifies a four-digit CIC (i.e., one of the newly assigned four-digit CICs that has no equivalent three-digit CIC). The treatment of this situation by the SCP should be dependent on the application in the SCP and is as follows:

- (1) For an SCP providing 800 Database Service, the SCP should request that the SSP provide out-of-band treatment to the caller. In addition, the SCP should generate an Exception Report and send it to SMS to indicate the occurrence of this situation.

- (2) For the Line Information Database ("LIDB") application providing Alternate Billing Services ("ABS"), up to three carriers may be specified: Primary Preferred IXC, Alternate Preferred IXC and Preferred INC. The SCP should return the CICs only for those carriers that have three-digit codes. If none are specified as three-digit codes, no CICs should be returned. Refer to TR-TSY-000271, Operator Services Systems Generic Requirements ("OSSGR"), Section 3.5.14.3, for the OSS requirements for handling the situation where no CIC is returned in the response message.
- (3) For the Business Services Database ("BSDB") application providing Private Virtual Network ("PVN") services, a customer record can specify up to three CICs, one primary carrier and two alternate carriers. The SCP should return only those CICs for carriers that have three-digit codes. If no three-digit CICs are specified but trunk groups for private facilities are identified the SCP should return a response to the SSP, including the private facilities, but the call treatment indicator for the final trunk group should be set to indicate no overflow to the public network. If no three-digit CICs are specified and no private facilities are specified, the SCP should request that the SSP provide vacant code treatment to the caller.

Service Management System.

The SMS will require modification to handle a four-digit CIC code. However, in contrast to the impacts to the other network elements (*i.e.*, EOs, ATs, SSPs), SMS must view the change as a flash cutover because it will be the responsibility of the SCP to determine whether to return a three- or four-digit CIC to the querying SSP.

Coincident with a designated release of SMS, a four-digit CIC will be the only type of CIC supported within the system.

It may be useful to note that the Call Management Services Data Base ("CMSDB")/Service Management System Interface Message Manual can currently support a four-digit CIC. An existing field length indicator serves to designate the length of CIC transmitted.

Currently, SMS supports only a three-digit CIC. The changes required to the SMS are substantial to support a four-digit CIC. Because SMS is being upgraded to handle multiple CICs per carrier, this capability will need to be extended to the four-digit scenario.

Conversion of customer records will be required to support the expanded field size, so that all existing CICs of the form XXX can be mapped to the recommended format of 0XXX and new carriers can be supported.

All tables containing CICs will need to be expanded to support the new format.

A number of user interface screens will require redesign to handle the changes. These include those portions of the customer record that allow the user to enter CICs. Additionally, a number of reports will be impacted.

SS-7 Signaling.

This section describes the added SS-7 requirements, for an SPC System supporting the four-digit CIC dialing and signaling plans, for call completion between LECs and IXC\INC. In particular, the EAEOs, AT, IXCs, and INCs should accommodate SS-7 signaling and interworking for both dialing and signaling plans that include the three-digit and four-digit CIC. The following paragraphs specify the required modifications to SS-7 signaling protocol in EAEOs and ATs that will facilitate transition to the new CIC dialing and signaling formats.

For originating calls to an IXC or INC, the EAEO should be able to determine the customer's dialing format, that is, three- or four-digit CIC. The EAEO should also be able to formulate an appropriate outgoing Initial Address Message ("IAM") for the trunk group that uses either three- or four-digit CIC signaling.

End-Office Directly Connected To An IXC/INC.

When the EAEO is directly connected to the IXC or INC, the format of the outgoing IAM will depend on whether the call is domestic or international. See below for the specific format of the outgoing IAM for domestic and international calls.

For domestic inter-LATA calls from an EAEO (or an AT also serving as an EO to a directly-connected IXC, no change is needed to the requirements contained in TR-TSY-000394.

For international calls from an EAEO to a directly-connected INC, the SS-7 INC call-origination procedures should be followed; the Transit Network Selection ("TNS") parameter should be included in the outgoing IAM. The following sections describe the IAM coding procedures for different INC selection and trunk group scenarios possible at an EAEO (or an AT serving as an EO).

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- (1) If a three-digit CIC was dialed (applies during the Permissive Dialing period) and the outgoing trunk group supports three-digit signaling, the outgoing IAM should include the TNS parameter. See TR-TSY-000394 for the coding of the IAM and the TNS parameter for three-digit CIC signaling.
- (2) If a three-digit CIC was dialed (applies during the Permissive Dialing period) and the outgoing trunk group supports four-digit CIC signaling, the outgoing IAM should include the TNS parameter. The digits subfield of the outgoing IAM should include the TNS parameter. The digits subfield of the outgoing TNS parameter should be coded 0XXX, where XXX is the dialed CIC.
- (3) If a four-digit CIC was dialed or presubscription was used, and the outgoing trunk group supports four-digit CIC signaling, the outgoing IAM should have a TNS parameter coded according to the four-digit CIC signaling format.
- (4) If a four-digit CIC was dialed or presubscription was used, and the outgoing trunk group supports three-digit CIC signaling, the outgoing IAM should include the truncated TNS parameter. The digits subfield of the truncated TNS should be coded XXX, where the leading (leftmost) digit has been truncated from the incoming four-digit CIC (XXXX). See TR-TSY-000394 for the coding of the IAM and the TNS parameter for three-digit CIC signaling.

EAE0 (SS-7) Connected To An IXC/INC (SS-7), Via A AT With SS-7.

When the SS-7 EAE0 is not directly connected to the SS-7 IXC/INC, the EAE0 will route calls via an SS-7 AT. For domestic and international calls routed to an INC via an AT, the EAE0 would formulate an appropriate outgoing IAM and send it to the AT. The TNS parameter should be included, in the outgoing IAM, for both IXC and INC calls. In this case, an SPC System supporting four-digit CIC signaling is assumed to be homed on an AT capable of receiving four-digit CICs.

- (1) If three-digit CIC dialing was used (applies during the Permissive Dialing period), the three-digit CIC (XXX) should be expanded to 0XXX and the outgoing IAM should have a TNS parameter consistent with the four-digit CIC signaling format.
- (2) Otherwise, the outgoing IAM should include the TNS parameter containing the four-digit CIC corresponding to the dialed or presubscribed CIC of the primary carrier.

SS-7 Access Tandem Procedures.

The following sections specify the SS-7 Access Tandem procedures for originating calls between EAEOs and IXC's or INC's, via an AT. The section below specifies the incoming, with respect to the AT, call origination procedures and another section specifies the outgoing, with respect to the AT, call origination procedures.

Incoming to the AT (All SS-7 Connections).

If the AT has received an IAM from the EAEO, the AT should determine, by reference to the incoming trunk group, the expected signaling format of the incoming IAM. In particular, the expected format of any received TNS parameter should conform to the trunk group status as supporting either three-digit or four-digit CIC codes. The AT's response to the incoming message will depend on the signaling format of the incoming message as below:

- (A) If the TNS parameter is not included in the incoming IAM, the AT procedures in TR-TSY-000317 and TR-TSY-000394 should be followed. Note this applies to non-equal-access calls.
- (B) If the TNS parameter is included in the incoming IAM, the TNS parameter should correspond to the trunk group status as to whether updated EO or non-updated EO. See TR-TSY-000394 and for the formats of the IAM and TNS parameter for three- and four-digit CIC signaling, respectively. If the Network ID subfield of the TNS parameter is coded 0001 or 0010, a three-digit or four-digit CIC should be expected, respectively. For Network ID plan values other than 0001 and 0010 (note, 0000 is unused), the AT should send a release message back to the EAEO. In this instance, the cause value field of the cause indicator parameter should indicate:
 - (1) The protocol error "parameter with invalid coding."
 - (2) A location value of "local interface controlled by this signaling link."

Outgoing From The AT (All SS-7 Connections).

Because the updated AT may be connected to updated and non-updated EAEOs as of the Permissive Dialing period, the EAEO to AT trunk group may use either the three-digit or four-digit CIC signaling format for a given trunk group; updated EAEOs will transmit four-digit CIC signaling to the updated AT and non-updated EAEOs will transmit three-digit CIC signaling to the updated

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AT. The format of the outgoing IAM (to the carrier) will depend on whether the call is domestic or international. The following list specifies the procedures for sending the IAM to the designated carrier:

- (A) For domestic calls, the CIC is not signaled to the carrier and hence the TNS parameter should not be included in the outgoing IAM. Therefore, the outgoing IAM should be coded according to TR-TSY-000394.
- (B) For international calls, the TNS parameter should be included in the outgoing IAM. The format of the outgoing IAM and the TNS parameter will depend on the signaling format of the outgoing trunk group. Sections below specify the formats of the outgoing IAM and the TNS parameter for three- and four-digit CIC signaling.
 - (1) If the incoming and outgoing trunk groups support three-digit CIC signaling, the outgoing IAM and the TNS parameter should be coded according to TR-TSY-000394.
 - (2) If the incoming trunk group supports three-digit CIC signaling and the outgoing trunk group supports four-digit CIC signaling, the digits subfield of the TNS parameter within the outgoing IAM should be coded 0XXX, where XXX is the incoming CIC. See TR-TSY-000394 for the formats of the IAM and the TNS parameter for four-digit CIC signaling.
 - (3) If the incoming and outgoing trunk groups support four-digit CIC signaling, the outgoing IAM and TNS parameter should be coded according to TR-TSY-000394.
 - (4) If the incoming trunk group supports four-digit CIC signaling and the outgoing trunk group supports three-digit CIC signaling, the leading (leftmost) digit should be dropped off the incoming CIC (XXXX) for the truncated CIC (XXX) that will be used in the outgoing trunk group signaling. The outgoing IAM and the TNS parameter should be coded according to the formats in TR-TSY-000394.

AMA Billing Requirements.

Expansion of the IXC/INC Prefix field in the Automatic Message Accounting ("AMA") record from three to four digits for Feature Group D calls is required.

- (1) If "10XXX" is dialed, the switching system will prefix the XXX code with a "0," thereby sending "0XXX."

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- (2) If "1010XXX" is dialed, the switching system will record the last four digits of the CAC code as the IXC/INC Prefix field on the billing record (i.e., "0XXX").